

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2004/033432

International filing date (day/month/year)
07.10.2004

Priority date (day/month/year)
17.10.2003

International Patent Classification (IPC) or both national classification and IPC
G03F7/20, G03F7/00

Applicant
INTEL CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/033432

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-36
Inventive step (IS)	Yes: Claims	
	No: Claims	1-36
Industrial applicability (IA)	Yes: Claims	1-36
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V.

Reference is made to the following documents:

D1 : US-4517280
D2 : EP-915384
D3 : EP-964305
D4 : US-5415835
D5 : WO-03071587

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claims 1, 9, 16, 22, 30 and 35 is not new in the sense of Article 33(2) PCT.

D1 describes a method for creating on a substrate a locally repetitive line and space pattern. A repetitive line and space pattern is initially created over the whole surface using interferometric exposure; in the second step selected parts of the pattern are covered with an additional resist using conventional photolithography. Finally the substrate is etched using the combination of both patterns, thereby achieving an arbitrary pattern consisting of lines and spaces in the substrate. Optionally, the patterning steps can be inverted, i.e. the interferometric patterning can be carried out with the additional, conventional mask already in place. D1 is novelty destroying for the subject-matter of claim 1.

Other documents cited in the search report propose a similar procedure using a single resist layer which is partially exposed using at least two partial exposures, at least one of them being interferometric. Only those parts of the repetitive pattern which have received light from both exposures will exceed the development threshold of the resist and result in an arbitrary pattern on the substrate. D2 and D3 are examples for this procedure. These methods are well established for both line patterns and hole patterns. D2 in particular describes a corresponding integrated exposure module (see Fig.21 and corresponding parts of the description) corresponding to the subject-matter of independent claim 30. The method is novelty destroying for claim 1 and the resulting devices are novelty destroying for the subject-matter of independent claim 9.

The subject-matter of claims 16 and 22 is similar to claim 1 with a number of additional parameters as far as the choice of the exposure method is concerned. While D1 does not specify in detail the exact exposure conditions, the environment presented in D2 strongly suggests that the use of exposure conditions corresponding to the conditions disclosed in these claims as well as in the other dependent claims.

The subject-matter of independent claim 35 corresponds to the logical sequence which has to be used when performing the methods disclosed in D1 and D2. It merely describes the method applied every time a general trim mask is used with a lithographic pattern. Novelty can therefore not be acknowledged for claim 35.

In the light of prior art D1 and D2 as well as the general knowledge illustrated by the other documents cited in the search report (particularly D3-D5) the dependent claims do not appear to disclose any subject-matter which could be used to establish novelty and inventive step in combination with any of the claims they refer to.

Re Item VII.

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art is not mentioned in the description, nor are any documents identified therein.

Re Item VIII.

Claims 8, 11-14 and 21 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

Structure of the claims: Claims 16 and 22 are formulated as independent claims, while they comprise all essential elements of claim 1. The claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

**WRITTEN OPINION OF THE
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AUTHORITY (SEPARATE SHEET)**

International application No.

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Claim 36 is dependent on claim 28. The relationship between these claims is however unclear.

Throughout the description the term "can" is used systematically. This results in only optional features being described for the whole of the description, and leads to a lack of clarity as far as the essential elements of the claimed invention are concerned.